



# **Governor's Drought Advisory Committee Meeting**

**March 21, 2007**

**National Weather Service**

**Gina Loss**

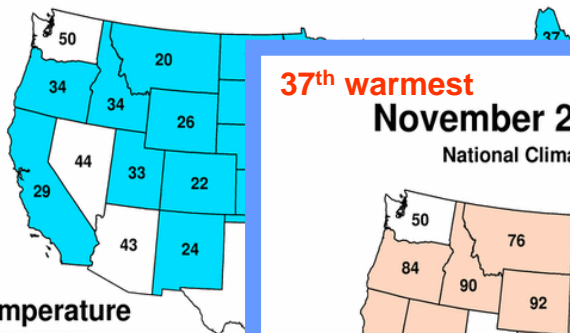
# Temperature Rankings

## Averaged Across Entire State

**20<sup>th</sup> coldest**

### Statewide Ranks October 2006

National Climatic Data Center/NESDIS/NOAA



#### Temperature

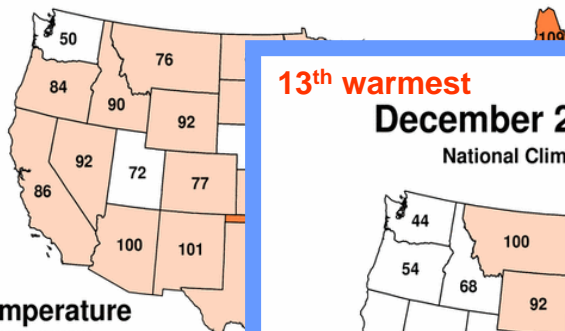
1 = Coldest  
112 = Warmest



**37<sup>th</sup> warmest**

### November 2006 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



#### Temperature

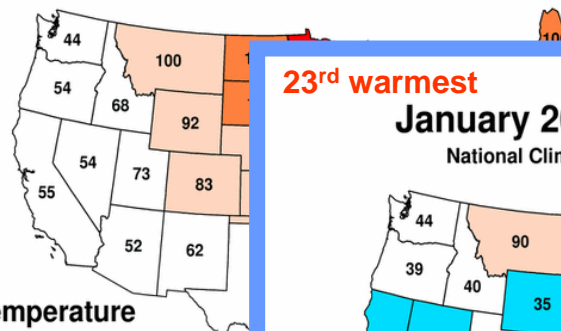
1 = Coldest  
112 = Warmest



**13<sup>th</sup> warmest**

### December 2006 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



#### Temperature

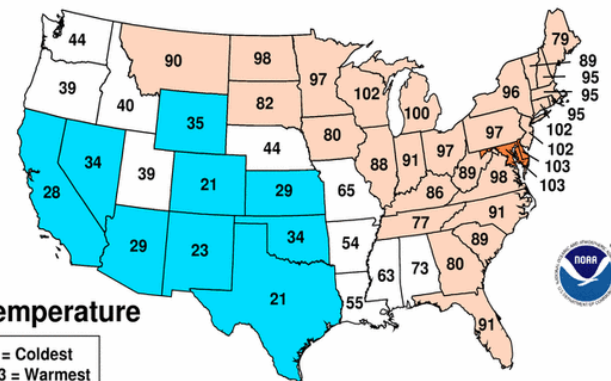
1 = Coldest  
112 = Warmest



**23<sup>rd</sup> warmest**

### January 2007 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



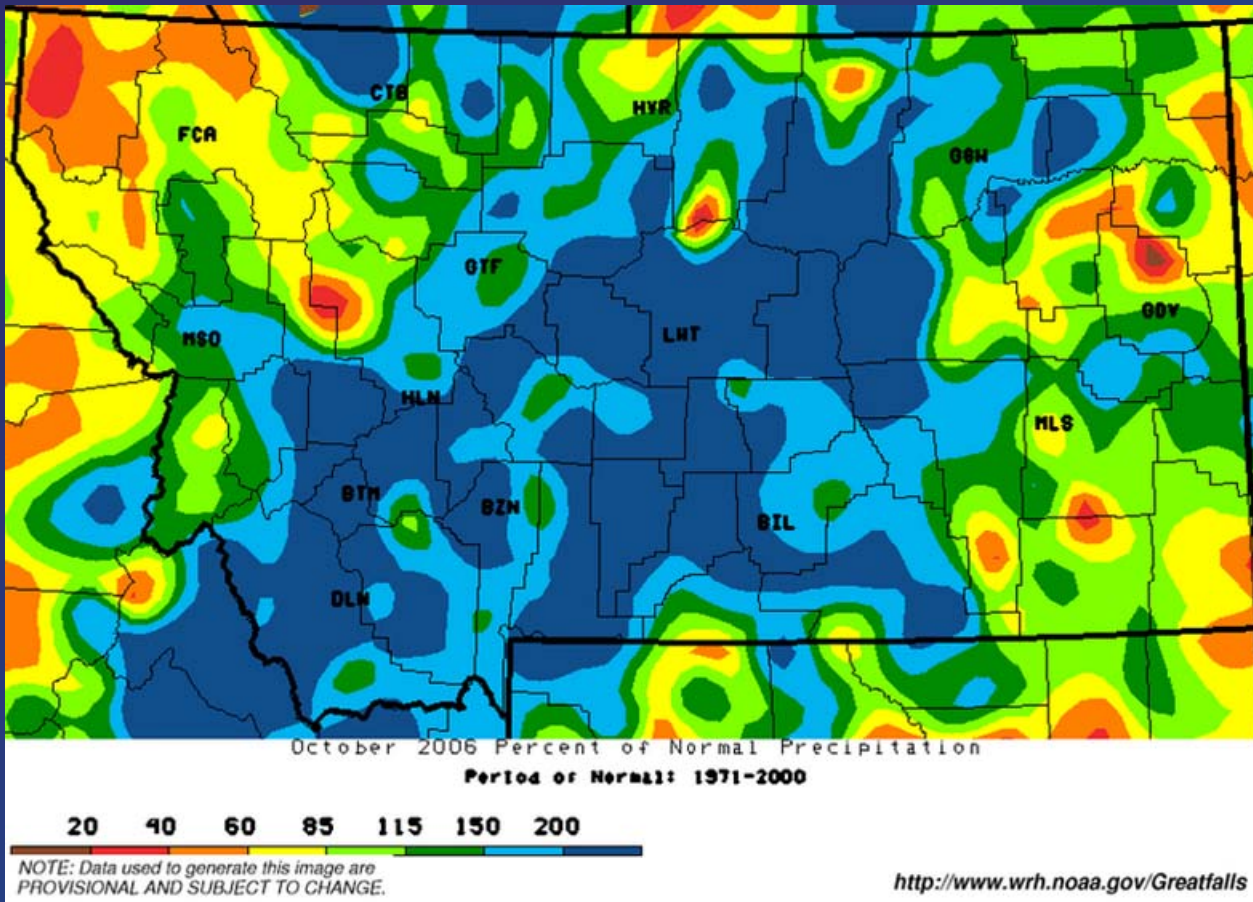
#### Temperature

1 = Coldest  
113 = Warmest



# Percent of Normal Precipitation October 2006

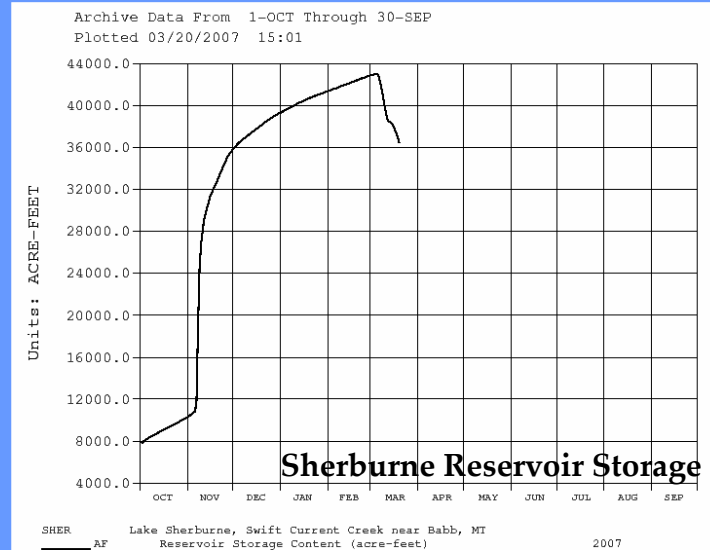
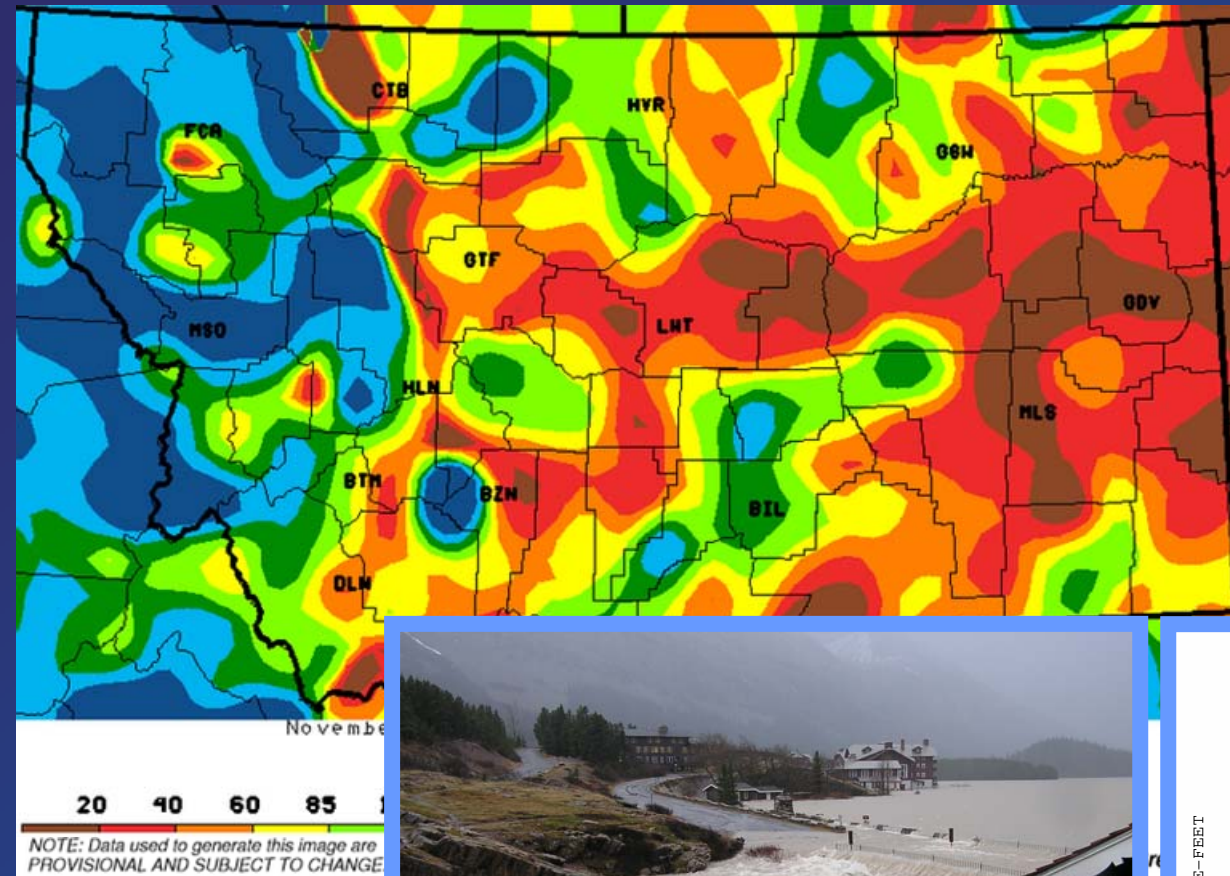
- Most of Montana above normal
  - Large band from southwest/south central to north central received more than 200% of normal
- Northwest Montana below to well below normal
  - Also isolated areas north central, east and southeast





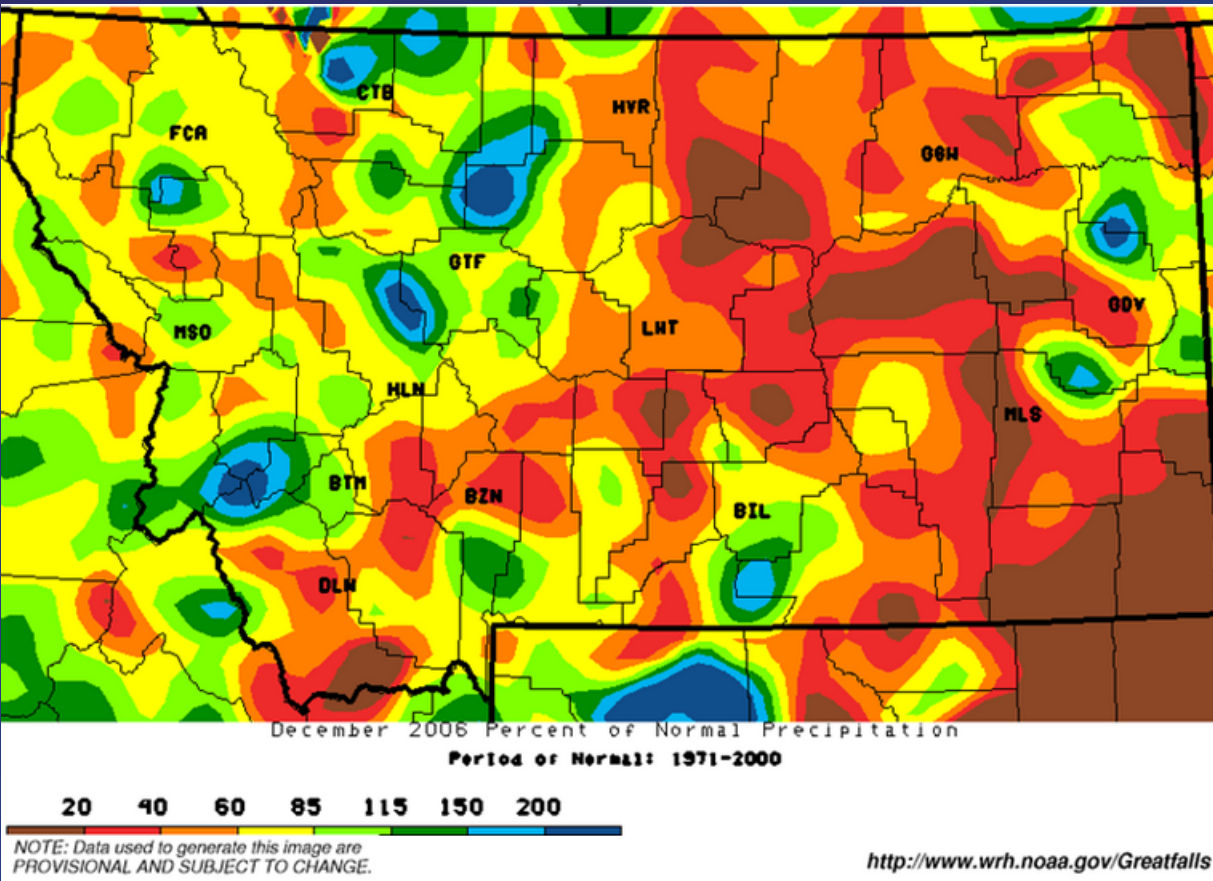
# Percent of Normal Precipitation November 2006

- Overall, drier than October
- West of divide generally near to above normal
- East of divide mostly below to well below normal
  - Areas central and east less than 20% of normal



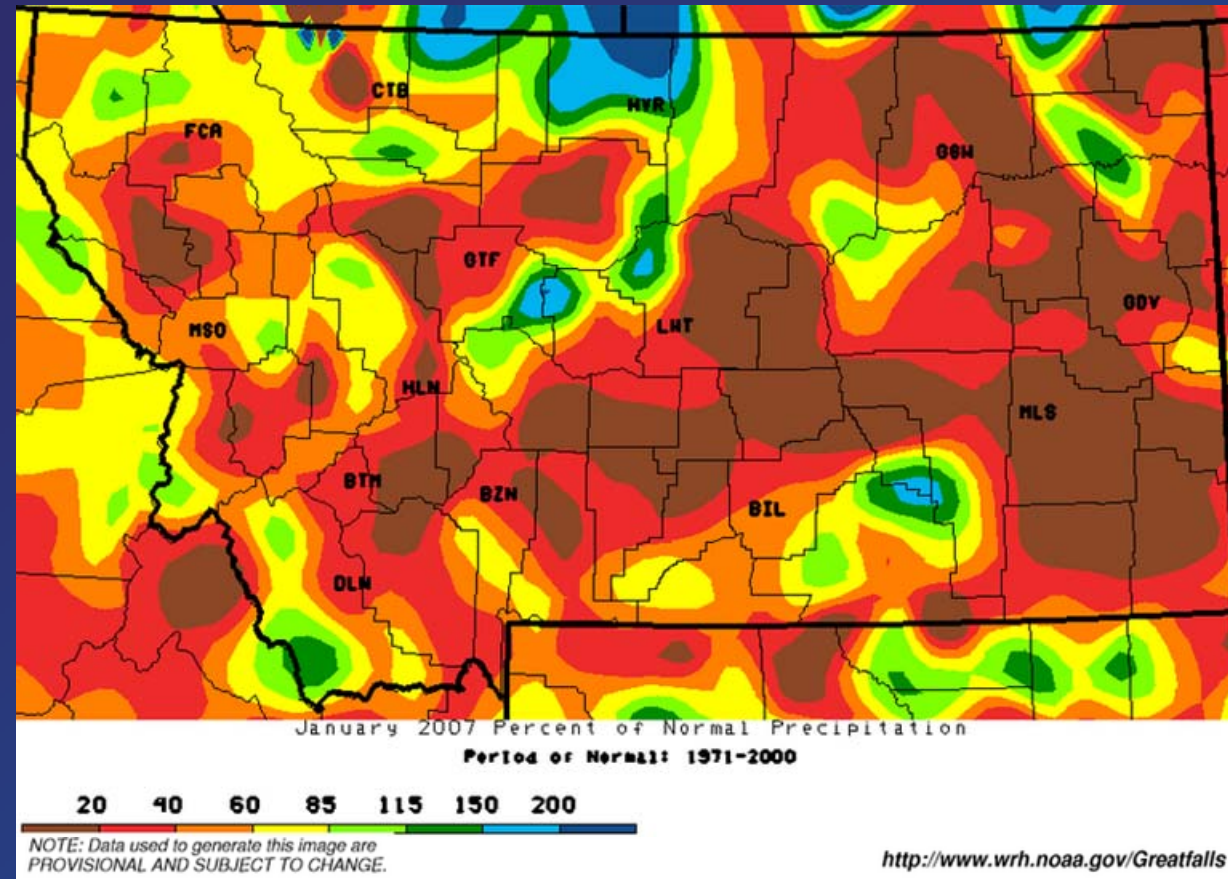
# Percent of Normal Precipitation December 2006

- December drier yet
- Most of Montana below to well below normal
- Increase in area receiving less than 20% of normal
  - Central
  - East
  - Southwest



# Percent of Normal Precipitation January 2007

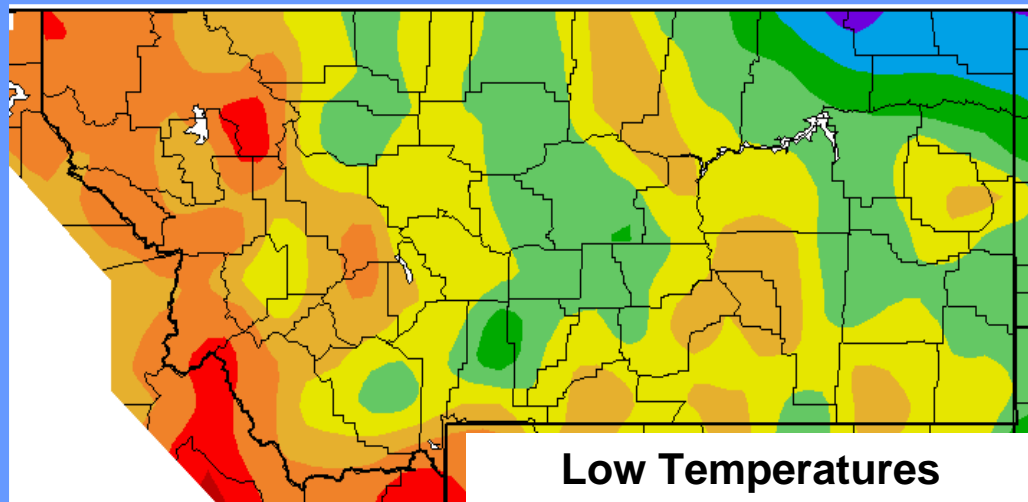
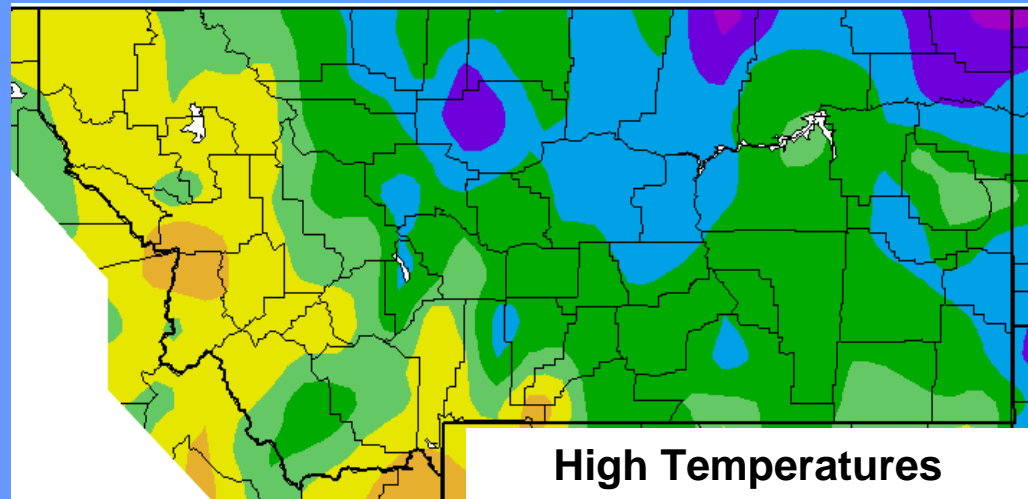
- 💧 January continued dry trend
- 💧 Most of state well below normal
- 💧 Large areas received less than 20% of normal





# Temperature Anomalies

February 6 – March 7



💧 Temperatures averaged near normal

💧 **Highs**

- *West and portions of southwest near to slightly above normal*
- *East of divide mostly 2 to 8 degrees below normal*

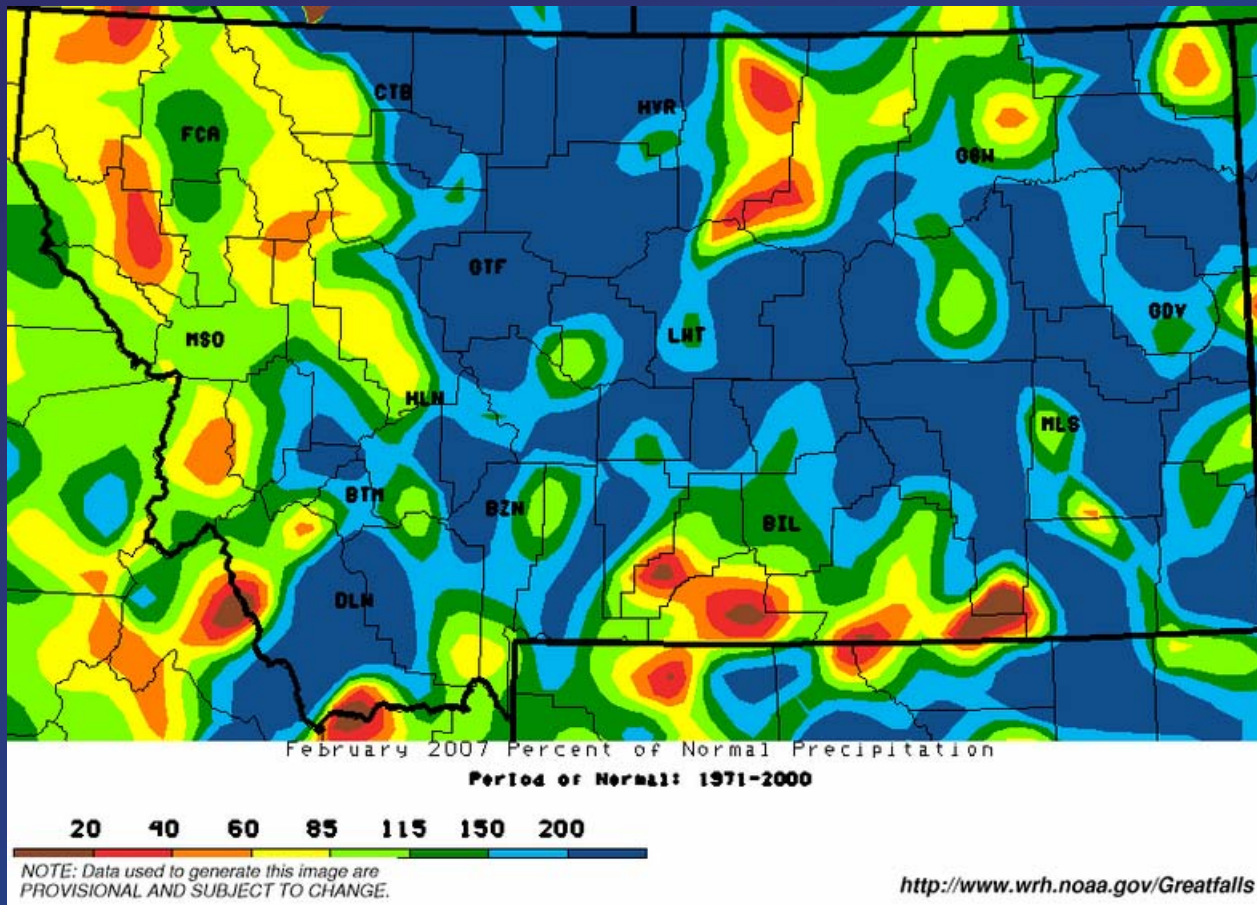
💧 **Lows**

- *West of divide – 2 to 8 degrees above normal*
- *East of divide – Mostly near normal*
  - Northeast was exception at 2 to 6 degrees below normal



# Percent of Normal Precipitation

## February 2007



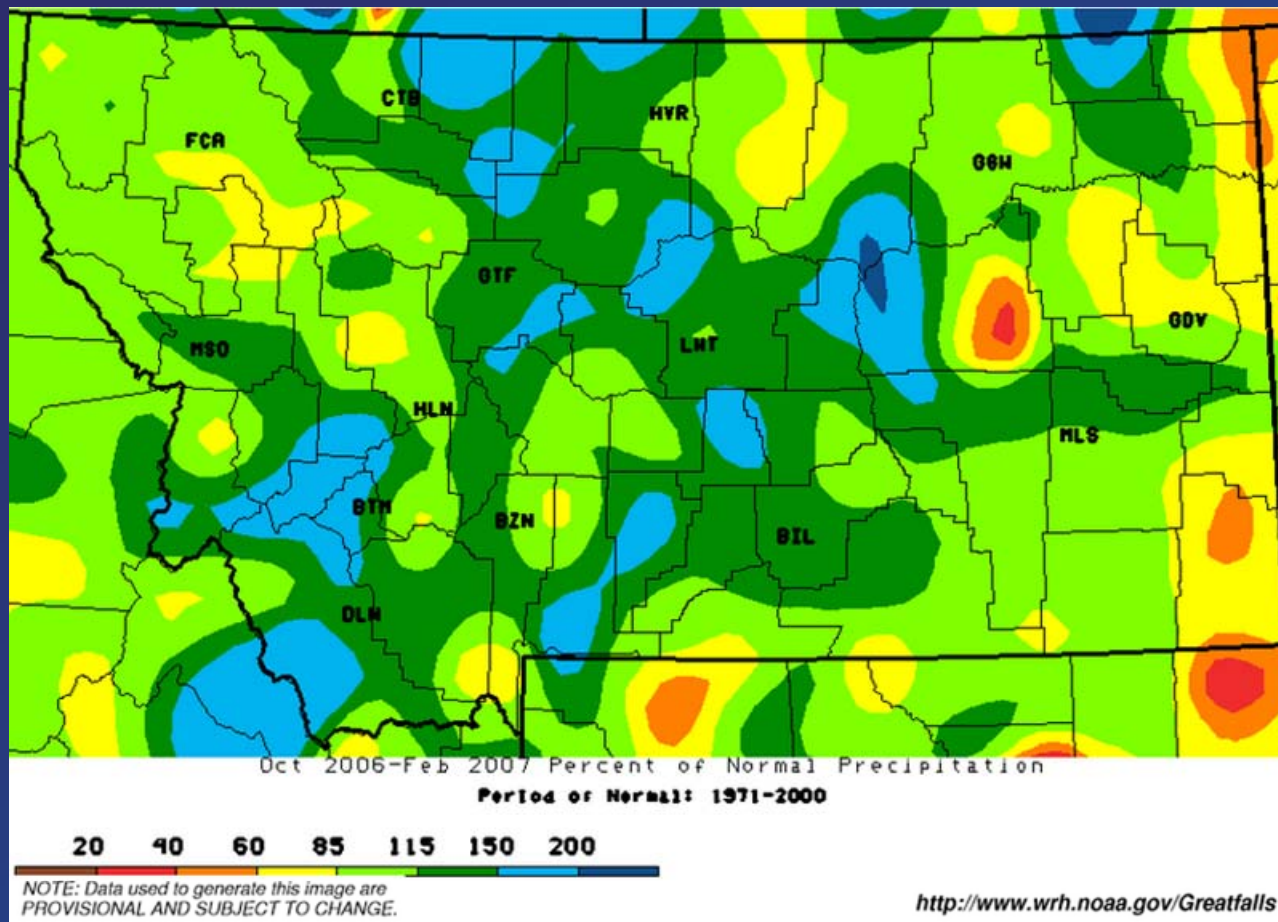
- Precipitation trend finally showed improvement
- Most of state received at least near normal precipitation
  - *Large areas with better than 200% of normal*
- Only relatively isolated areas below normal
  - *Northwest*
  - *Southwest*
  - *North central*
  - *South central*



# Percent of Normal Precipitation

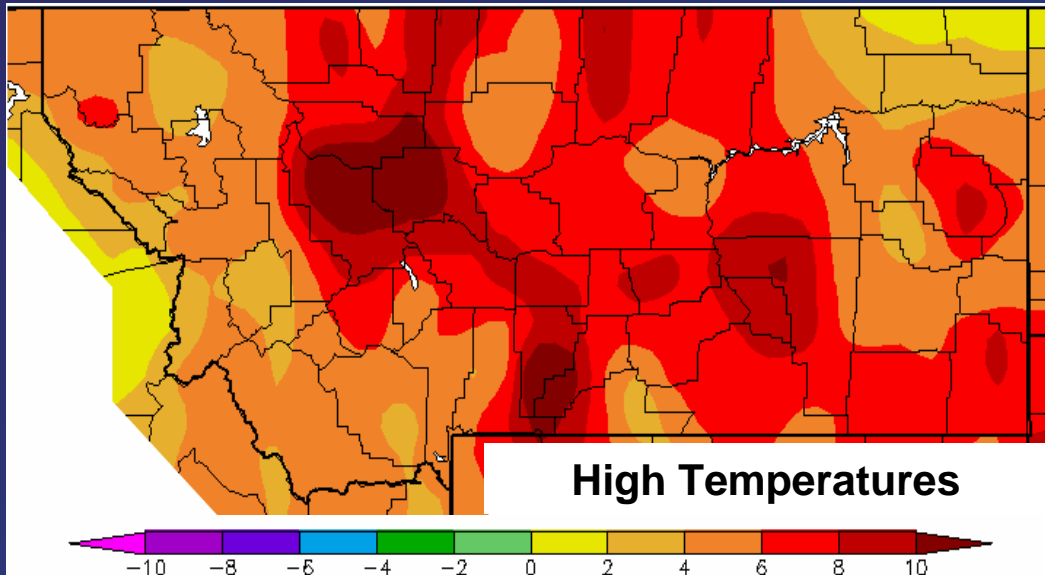
## Water Year 2007

- October 2006 – February 2007
- Most of Montana averaging at least near normal
  - Central and southwest above to well above normal*

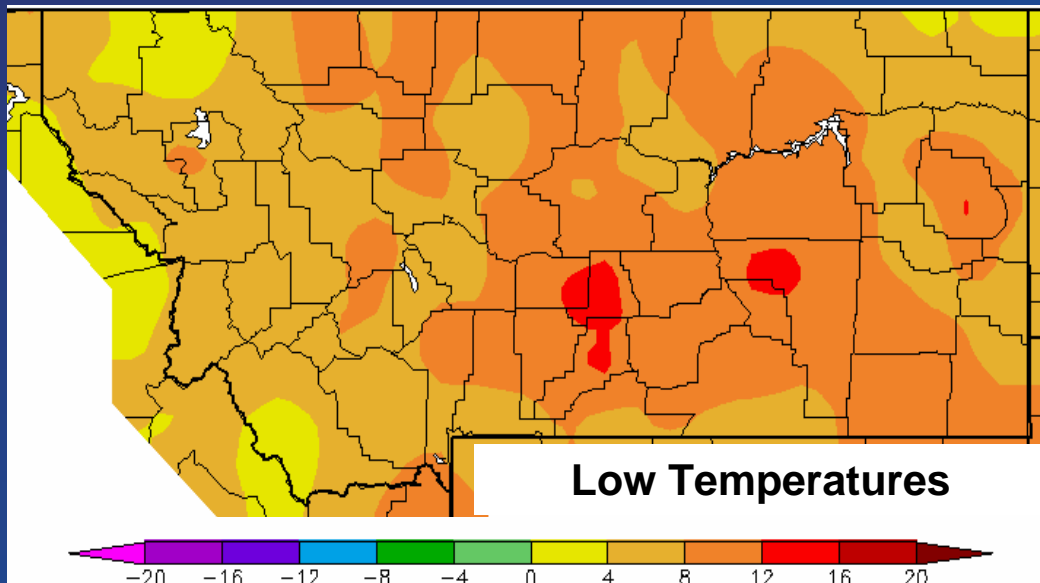


# Departure from Average Temperature

March 1 – March 18, 2006

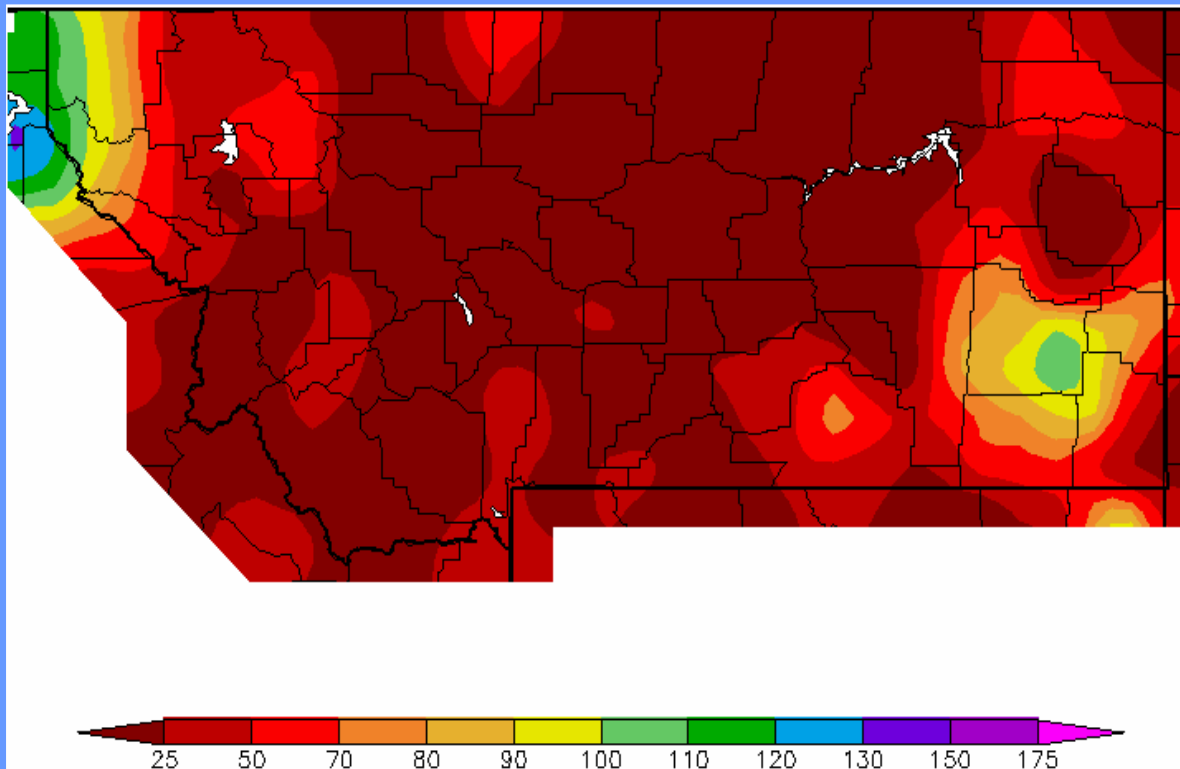


- 💧 **WARM!**
- 💧 **Overall average 6 to 8 degrees above normal**
- 💧 **Highs**
  - *West – 2 to 6 degrees above normal*
  - *East – 4 to 10 degrees above normal*
- 💧 **Lows**
  - *Generally 4 to 12 degrees above normal*



# Percent of Average Precipitation

March 1 – March 6, 2006



💧 **Dry!**

💧 **Virtually all of Montana well below normal**

- *Much of the state has received less than 25% of normal precipitation for the month so far*



# Precipitation Totals

## March and Water Year 2007

	MARCH 1 - 19				WATER YEAR TO DATE			
	ACTUAL PCPN	NRML PCPN	+/- NRML	% OF NRML	ACTUAL PCPN	NRML PCPN	+/- NRML	% OF NRML
<b>WESTERN MONTANA</b>								
BUTTE	0.01	0.47	-0.46	2	3.64	3.39	0.25	107
KALISPELL	0.24	0.75	-0.51	32	5.80	7.43	-1.63	78
MISSOULA	0.13	0.38	-0.25	34	5.77	4.33	1.44	133
MULLAN PASS	2.29	2.89	-0.60	79	34.33	30.43	3.90	113
<b>SOUTHWEST MONTANA</b>								
BIG SKY	0.47	0.78	-0.31	60	7.73	8.33	-0.60	93
BOULDER	0.00	0.28	-0.28	0	2.71	2.58	0.13	105
BELGRADE FIELD	0.13	0.56	-0.43	23	4.55	4.19	0.36	109
BOZEMAN MSU	0.33	0.79	-0.46	42	9.70	5.83	3.87	166
DILLON AIRPORT	0.00	0.29	-0.29	0	2.64	1.98	0.66	133
ENNIS	0.00	0.51	-0.51	0	4.91	3.52	1.39	139
HELENA	0.02	0.38	-0.36	5	2.99	2.86	0.13	105
ROGERS PASS 9 NNE	0.02	0.65	-0.63	3	4.41	4.70	-0.29	94
TOWNSEND	0.02	0.30	-0.28	7	2.64	2.28	0.36	116
W YELLOWSTONE	0.08	1.14	-1.06	7	6.01	10.48	-4.47	57
WISDOM	0.16	0.38	-0.22	42	3.55	3.76	-0.21	94

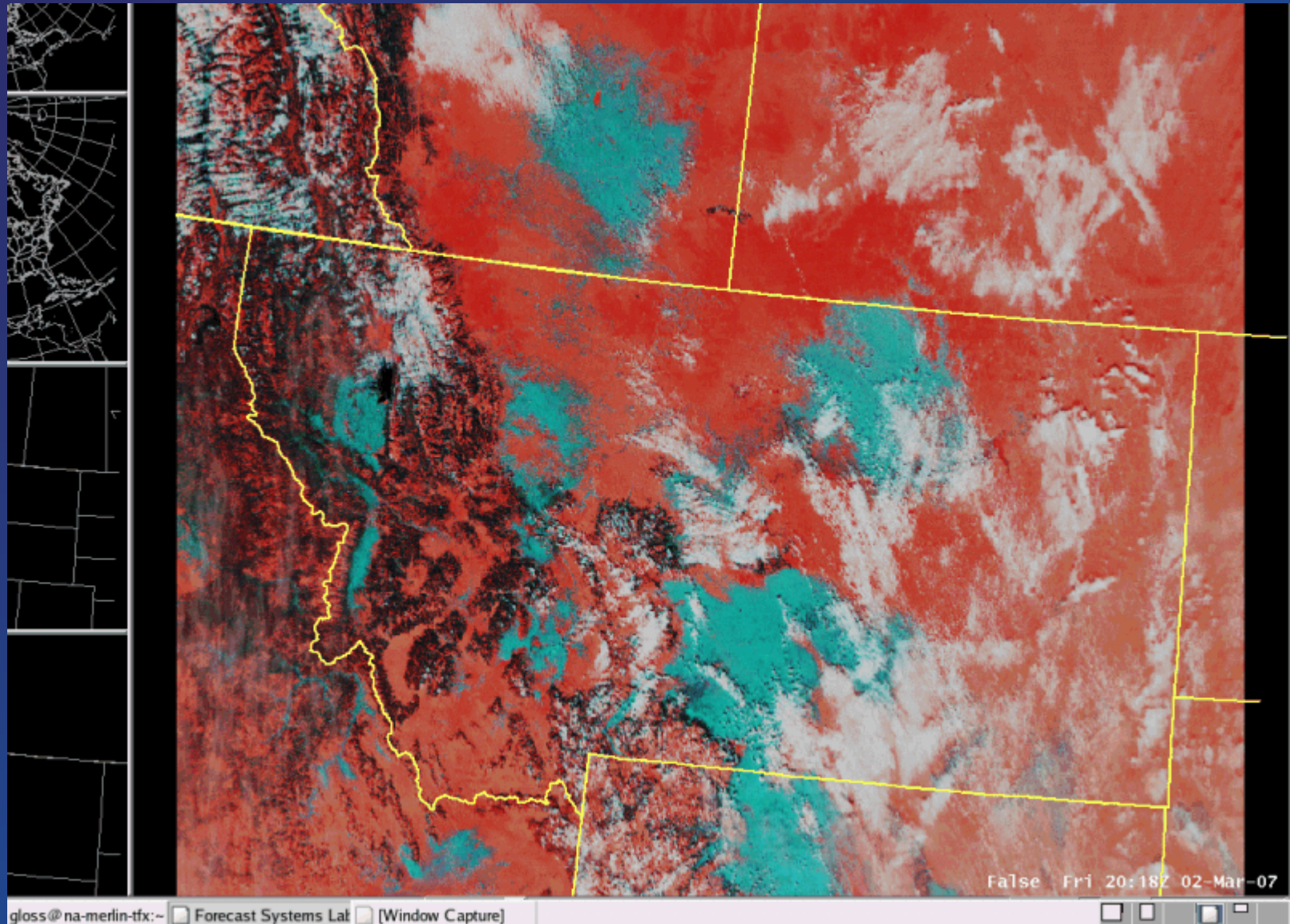
# Precipitation Totals

## March and Water Year 2007

	MARCH 1 - 19				WATER YEAR TO DATE			
	ACTUAL PCPN	NRML PCPN	+/- NRML	% OF NRML	ACTUAL PCPN	NRML PCPN	+/- NRML	% OF NRML
<b>CENTRAL MONTANA</b>								
BILLINGS	0.19	0.61	-0.42	31	4.70	4.61	0.09	102
CASCADE 20 SSE	0.03	0.38	-0.35	8	3.50	3.16	0.34	111
CHESTER	0.01	0.27	-0.26	4	3.68	2.16	1.52	170
CHOTEAU	0.00	0.19	-0.19	0	1.57	1.91	-0.34	82
CONRAD	0.00	0.38	-0.38	0	1.26	2.65	-1.39	48
FORT ASSINNIBOINE	0.00	0.38	-0.38	0	2.59	2.95	-0.36	88
FORT BENTON	0.01	0.49	-0.48	2	3.87	3.29	0.58	118
GOLD BUTTE 7 N	0.20	0.38	-0.18	53	3.77	2.80	0.97	135
GRASS RANGE	0.00	0.51	-0.51	0	4.70	3.78	0.92	124
GREAT FALLS	0.01	0.55	-0.54	2	4.32	3.95	0.37	109
HAVRE	0.02	0.38	-0.36	5	2.62	2.79	-0.17	94
LIVINGSTON	0.02	0.46	-0.44	4	5.28	4.08	1.20	129
LEWISTOWN	0.04	0.68	-0.64	6	4.18	4.77	-0.59	88
MARTINSDALE 3 NNW	0.08	0.37	-0.29	22	3.22	2.97	0.25	108
NEIHART 8 NNW	0.06	0.76	-0.70	8	8.12	5.77	2.35	141
STANFORD	0.01	0.53	-0.52	2	4.06	3.99	0.07	102
VALIER	0.01	0.26	-0.25	4	1.79	2.15	-0.36	83
WHITE SULPHUR SPRGS	0.01	0.48	-0.47	2	2.31	3.23	-0.92	72
<b>EASTERN MONTANA</b>								
GLASGOW	0.00	0.23	-0.23	0	2.25	2.33	-0.08	97
MILES CITY	0.21	0.28	-0.07	75	1.67	3.20	-1.53	52

# MODIS Satellite Imagery

March 2, 4, 7, 15, 17, 19 – Snow cover is red

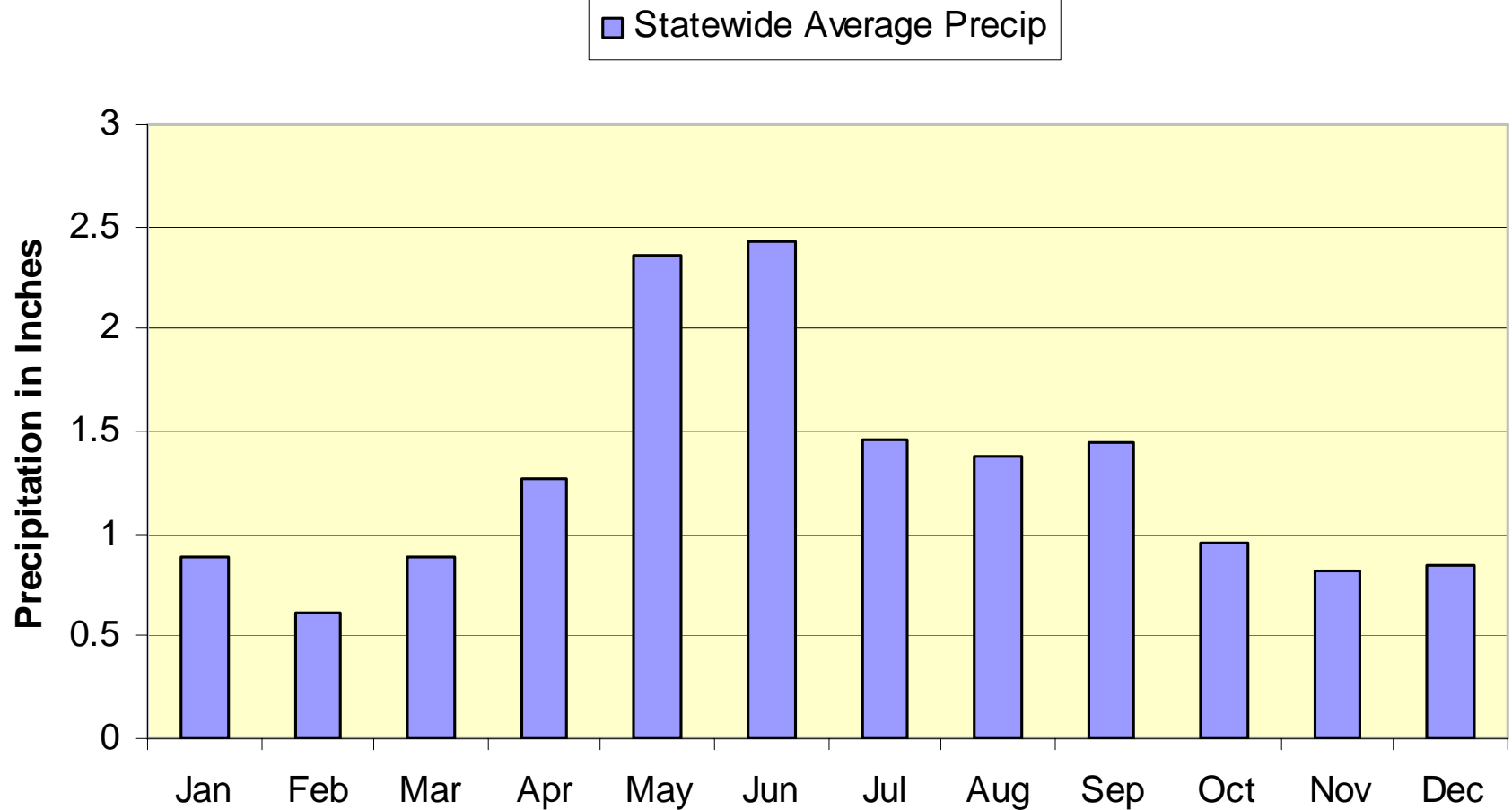


**MODIS – Moderate Resolution Imaging Spectroradiometer**

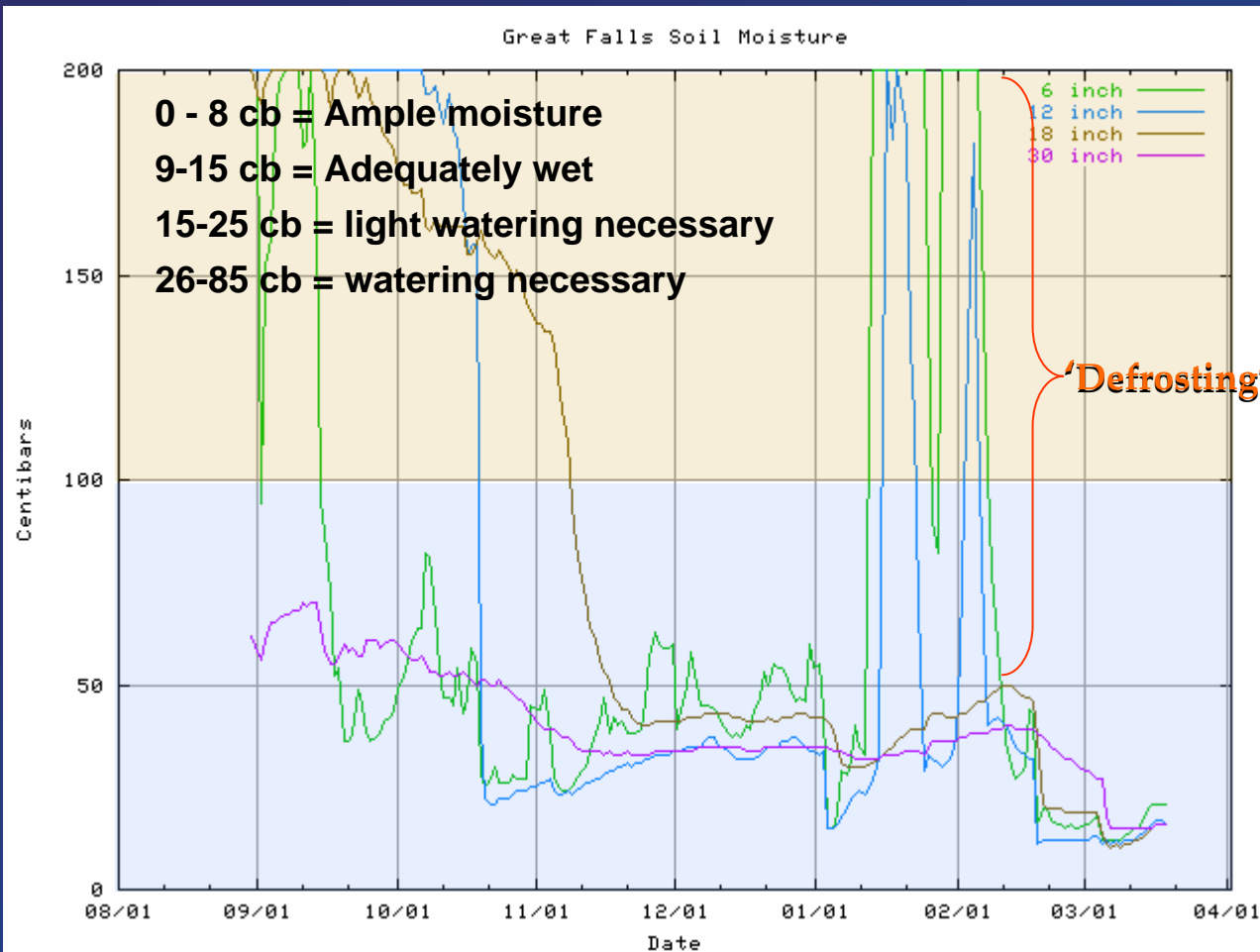


# Statewide Average Precipitation

## March begins transition to spring precipitation



# Great Falls Soil Moisture



💧 All levels moist  
– 15 to 25 cb

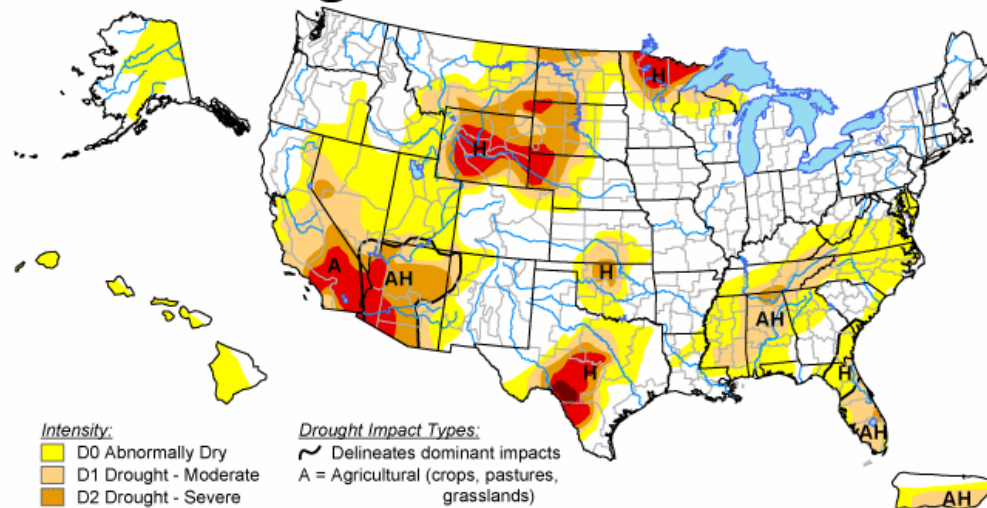
# National Drought Monitor

Issued March 13, 2007

## U.S. Drought Monitor

March 13, 2007

Valid 8 a.m. EDT



### Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

### Drought Impact Types:

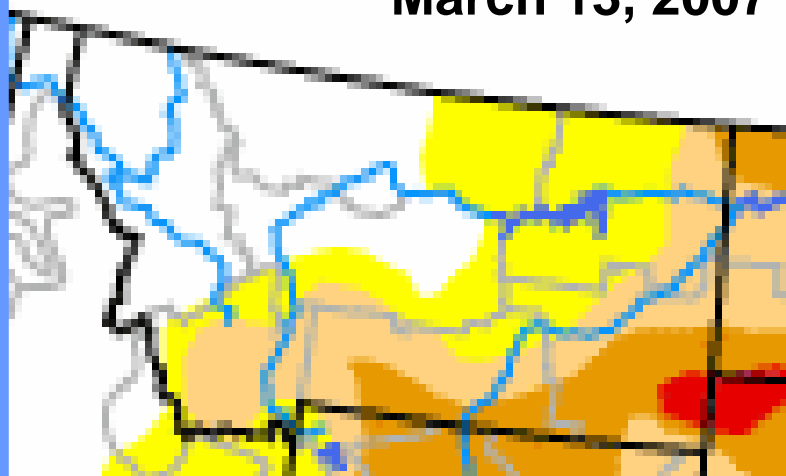
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor  
Local conditions  
for forecast state

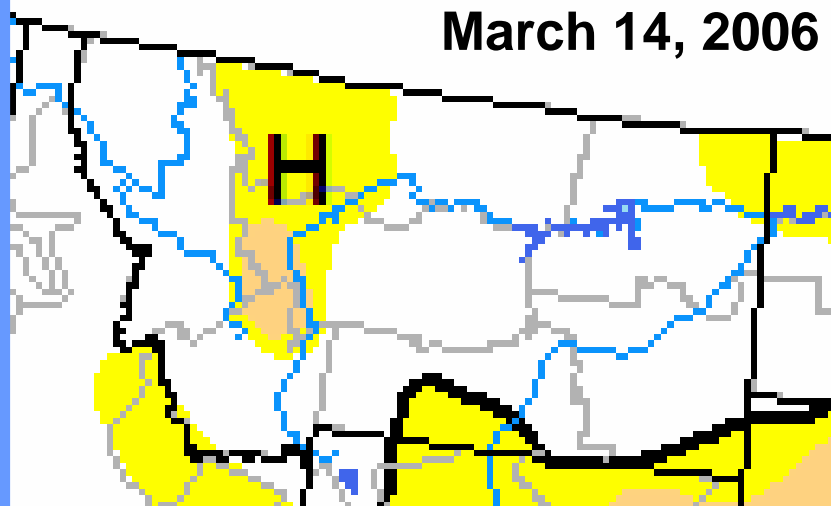
htt

- Southern and eastern Montana showing Moderate (D1) to Severe Drought (D2)
- Isolated area of Extreme (D3) southeast

March 13, 2007

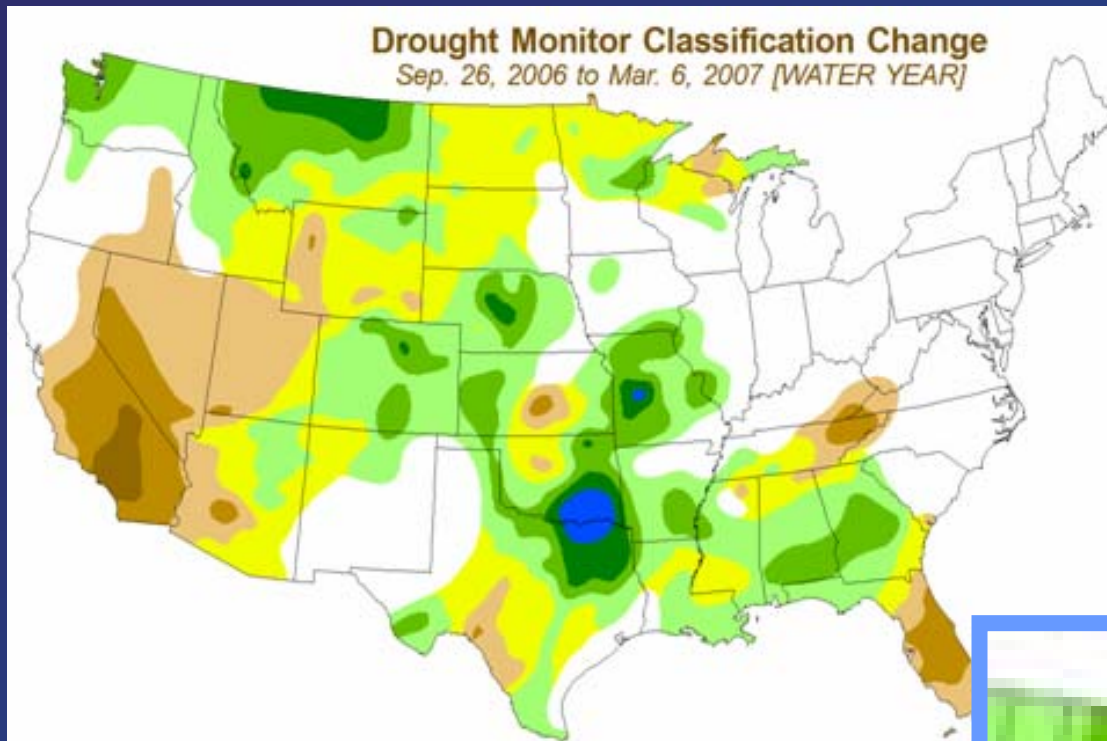


March 14, 2006

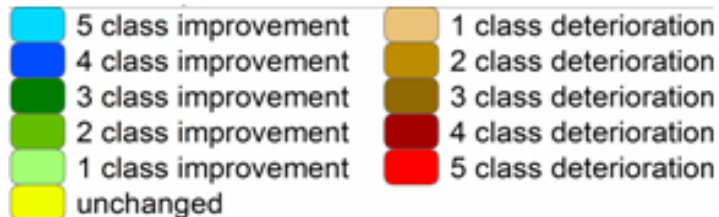




# Change in Drought Classification From Beginning of Water Year



- Most of west... central and north Montana has improved at least 1 category
- South generally unchanged
- No area has deteriorated

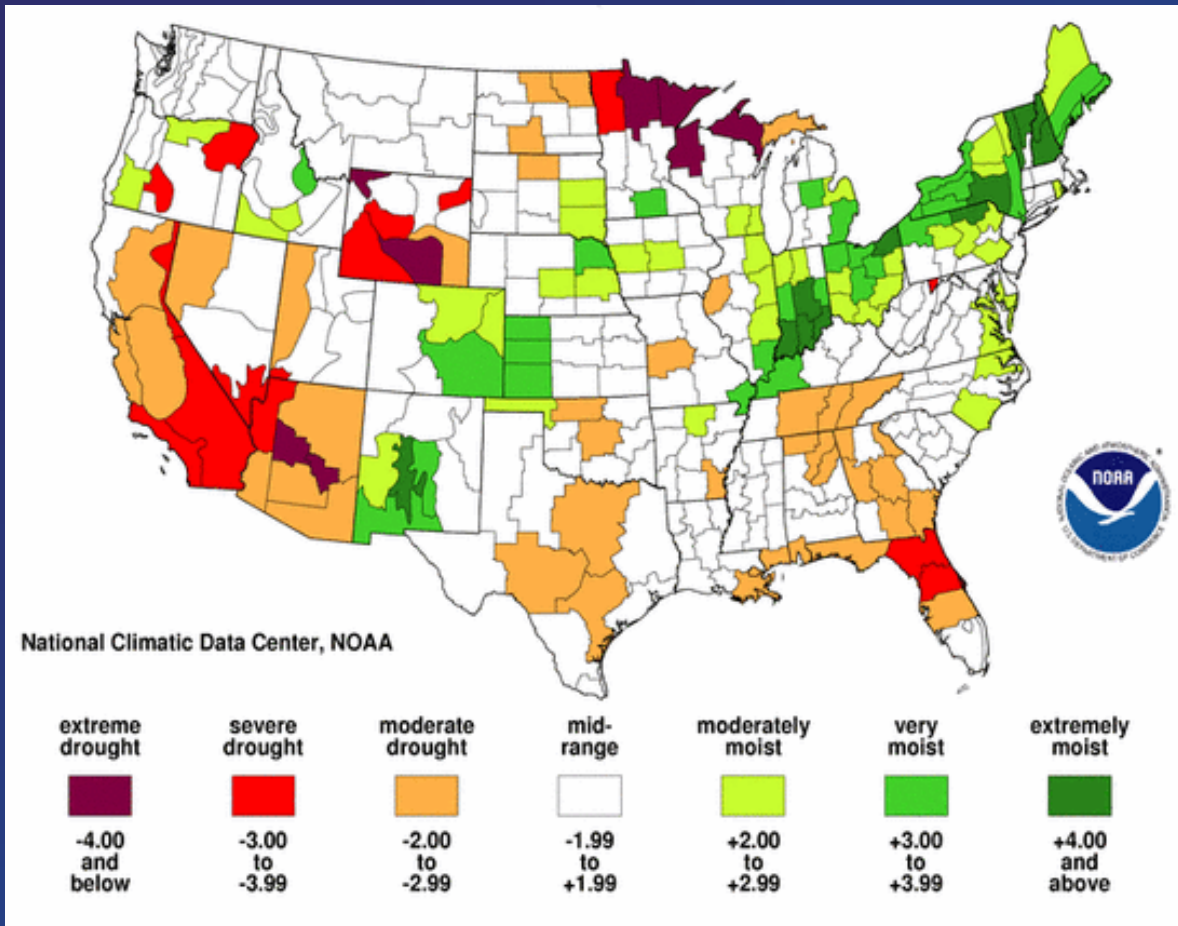


**Zoomed to Montana**



# Palmer Hydrological Drought Index

## February 2007

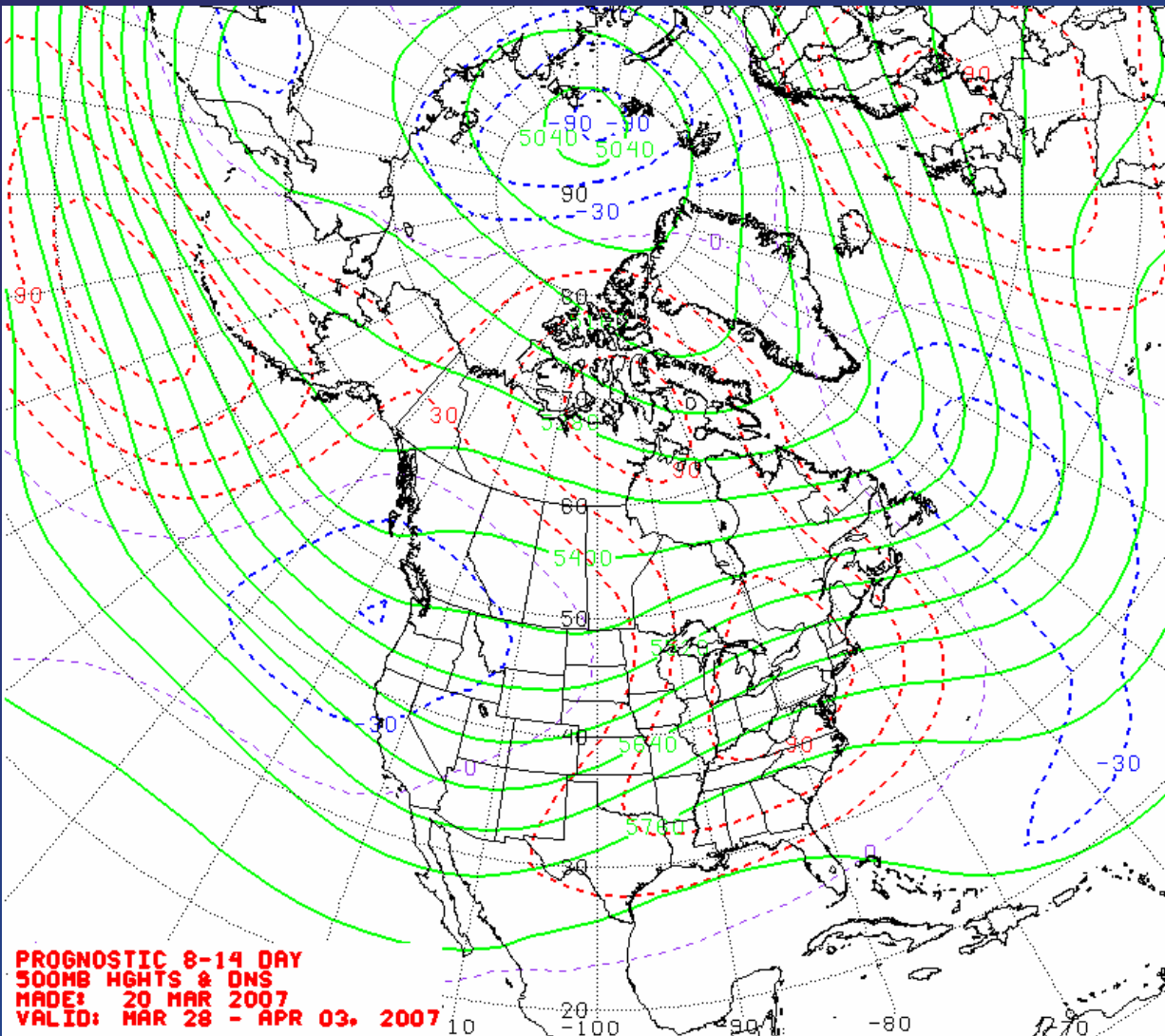


💧 No Montana climate divisions classified as either 'moist' or 'drought'

# 8 to 14 Day Outlook

## 500mb Heights and Anomalies

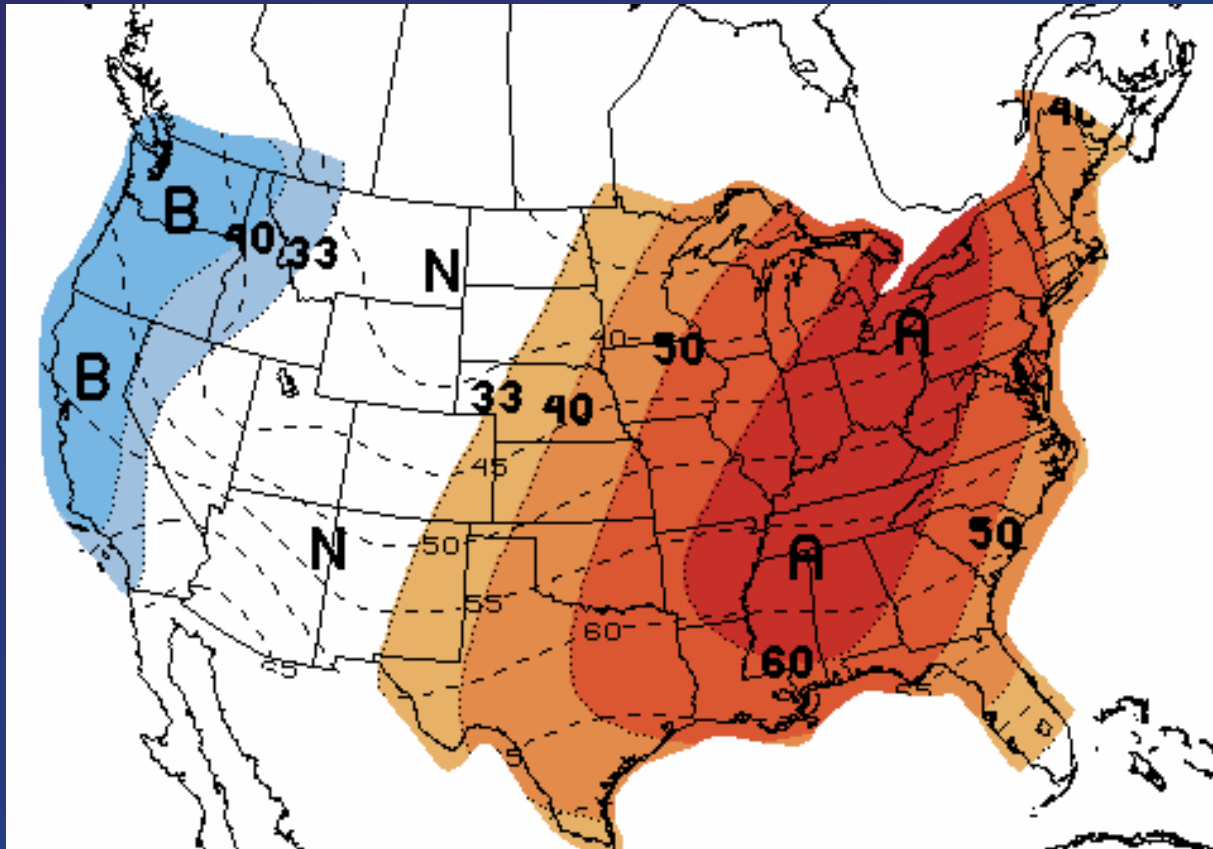
- Weak low pressure trough expected to begin moving in over western U.S.





# 8 to 14 Day Outlook – Temperatures

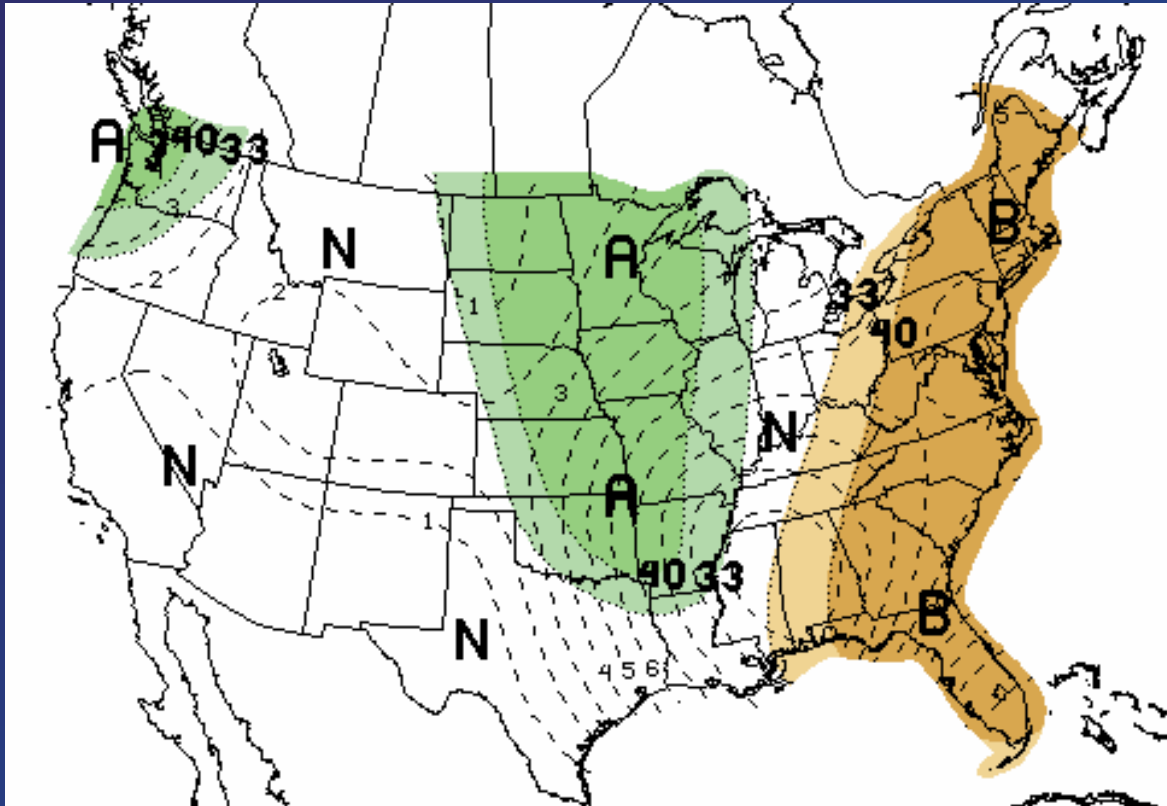
## Possible cooling west



- March 28 – April 3
- 33% to 40% chance temperatures will be below normal over western Montana
- Equal chances temperatures will be above...below or near normal over eastern Montana
- Averages
  - *Highs – Upper 30s and 40s*
  - *Lows – Teens to mid 20s*

# 8 to 14 Day Outlook – Precipitation

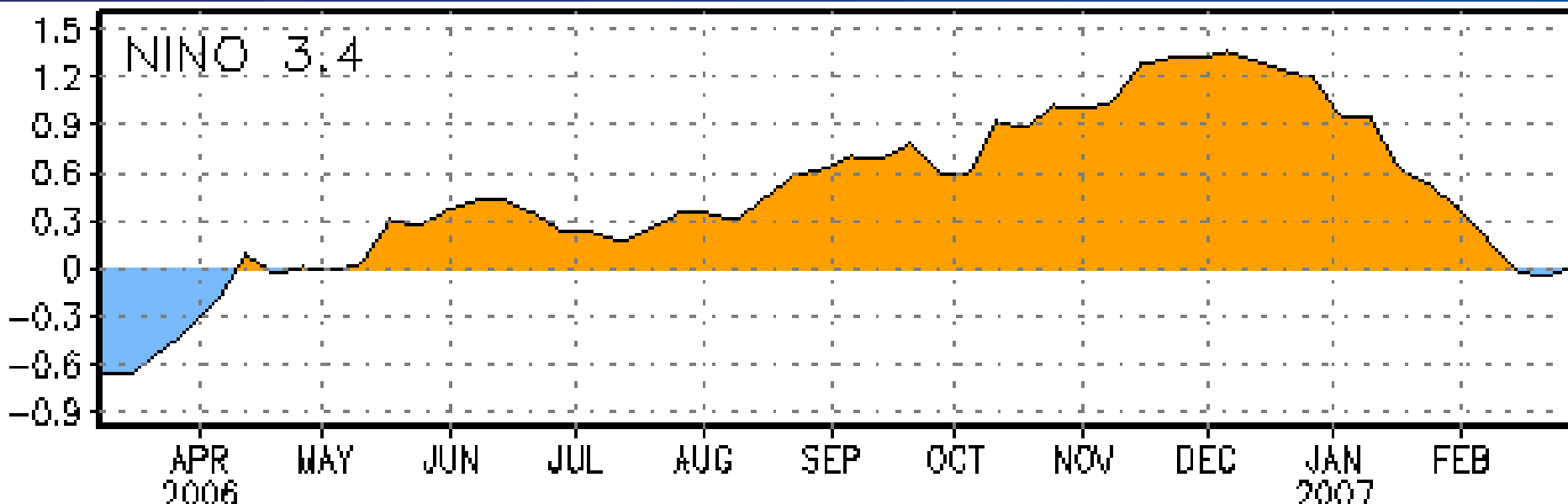
## Mostly dry



- March 28 – April 3
- Equal chances for above... below or near normal precipitation across all of Montana
- Normals
  - 0.50 to 1.25 inches

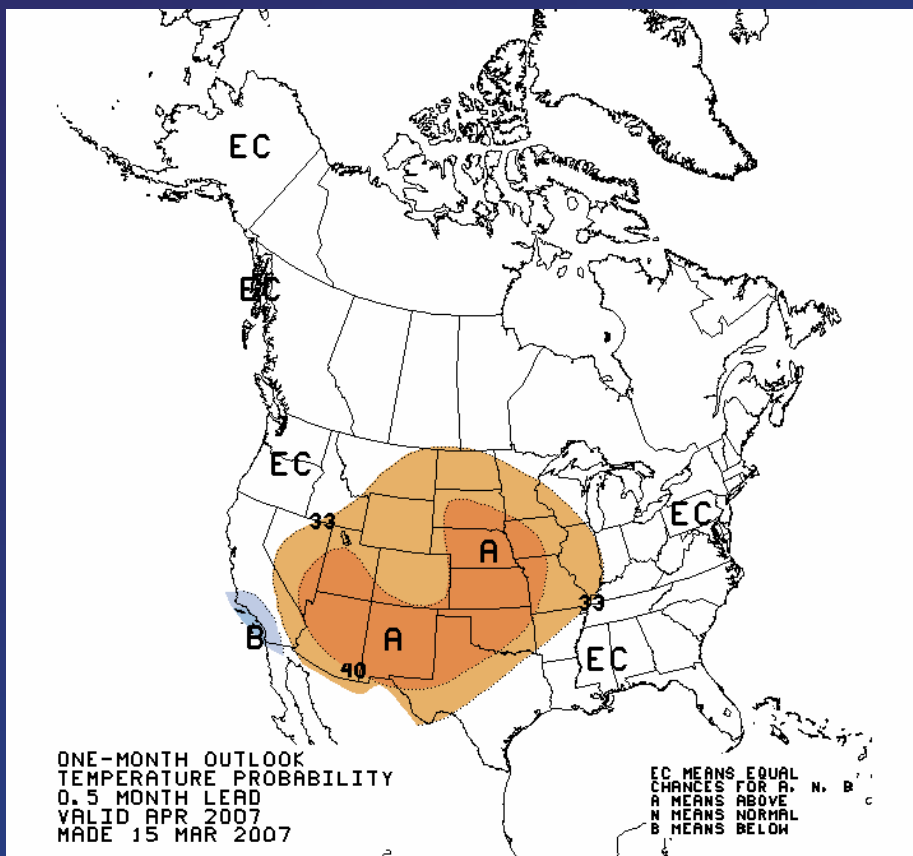
# El Niño / La Niña

- El Niño conditions (above normal sea surface temperatures) dominated during autumn and early winter
- El Niño conditions disappeared from eastern Pacific during February... currently in neutral phase
- Transition from neutral to La Niña conditions (below normal sea surface temperatures) possible during next 2-3 months



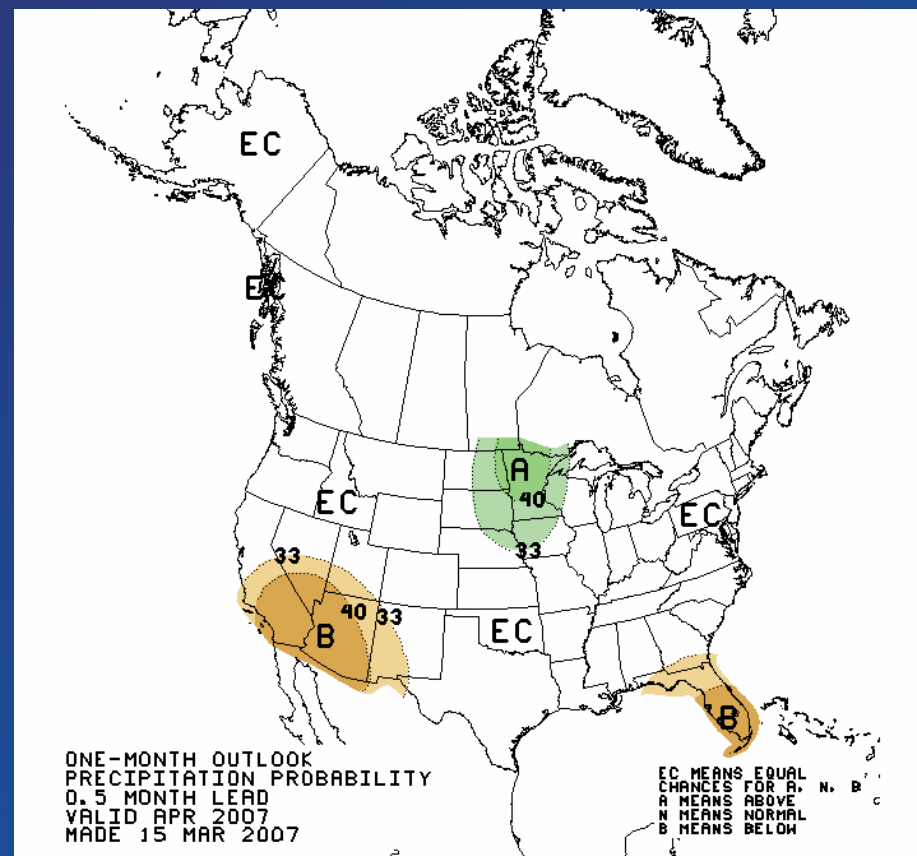
# April Outlook

## Temperature



- Better chances temperatures will be above normal over south and east Montana
  - 33% to 40% chance
- Remainder of area shows no forecast skill...
  - *Equal chances temperatures will be above... below or near normal*

## Precipitation

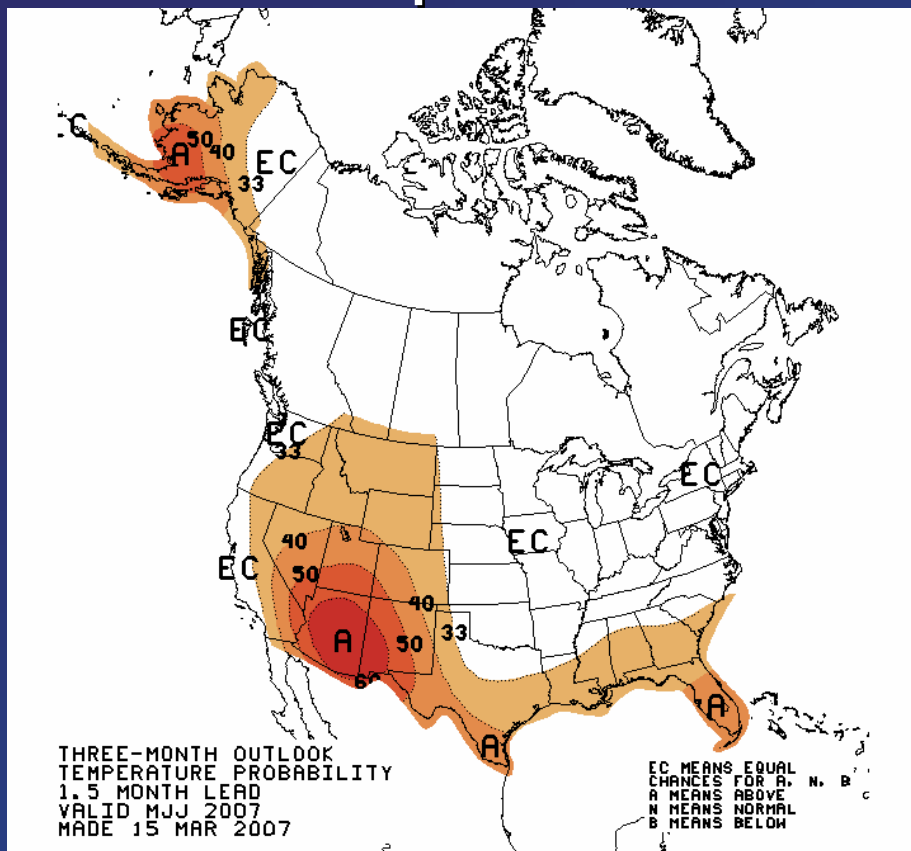


- No forecast skill across all of Montana...
  - *Equal chances precipitation will be above... below or near normal*



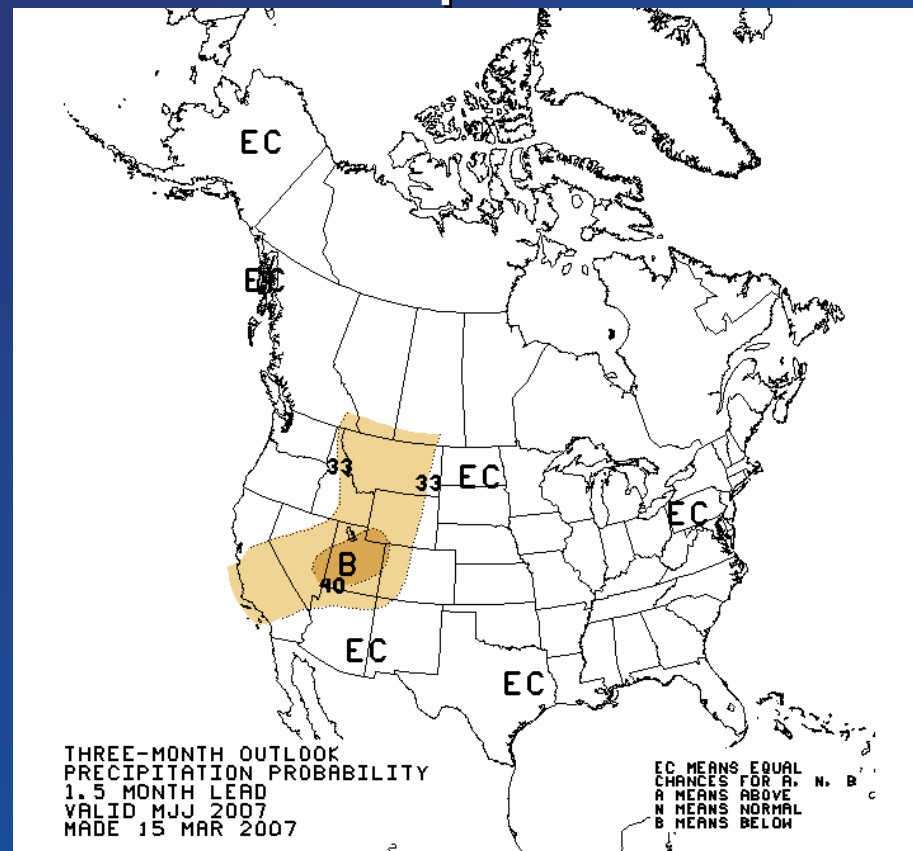
# May – July Outlook

## Temperature



- Better chances temperatures will be above normal across all of Montana
  - 33% to 40% chance for above normal temperatures

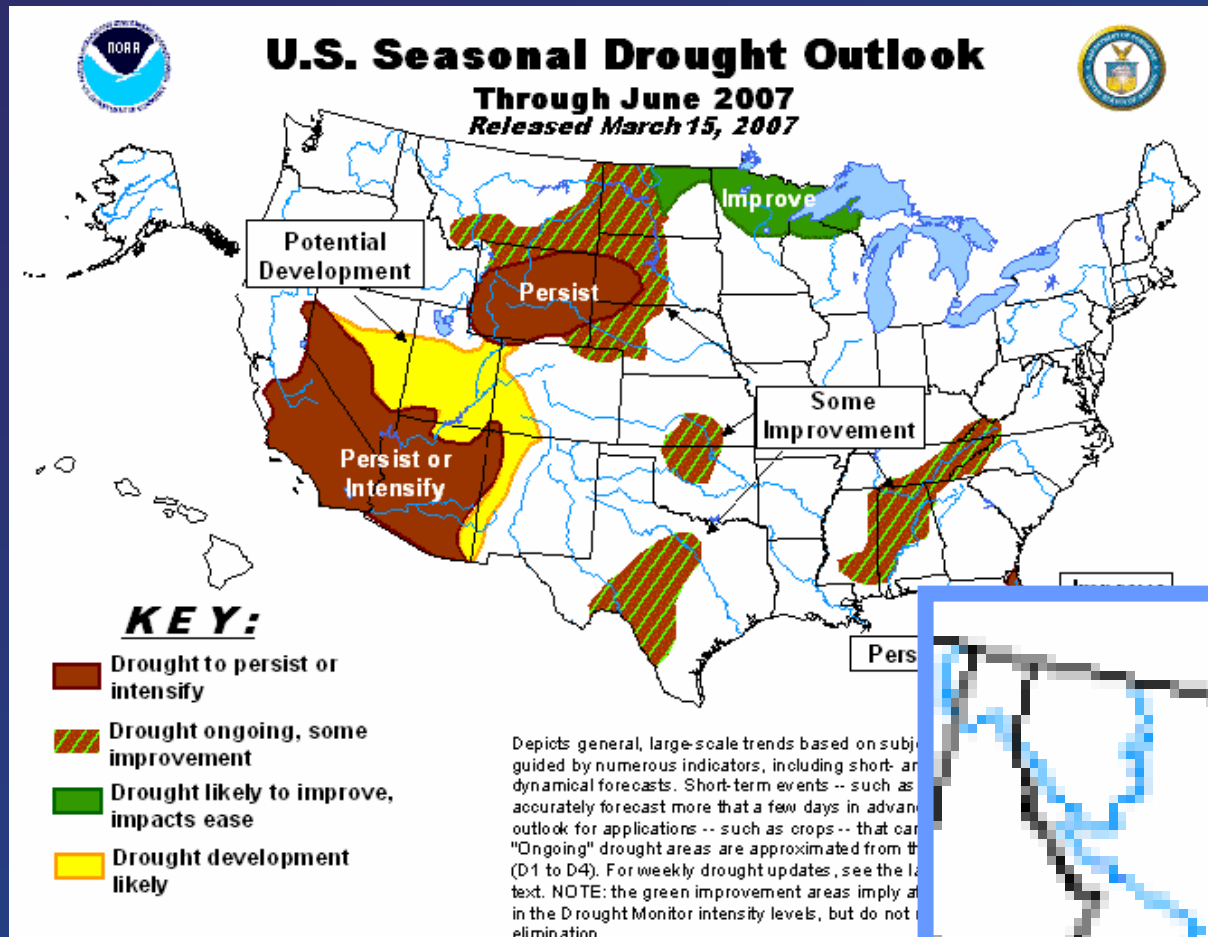
## Precipitation



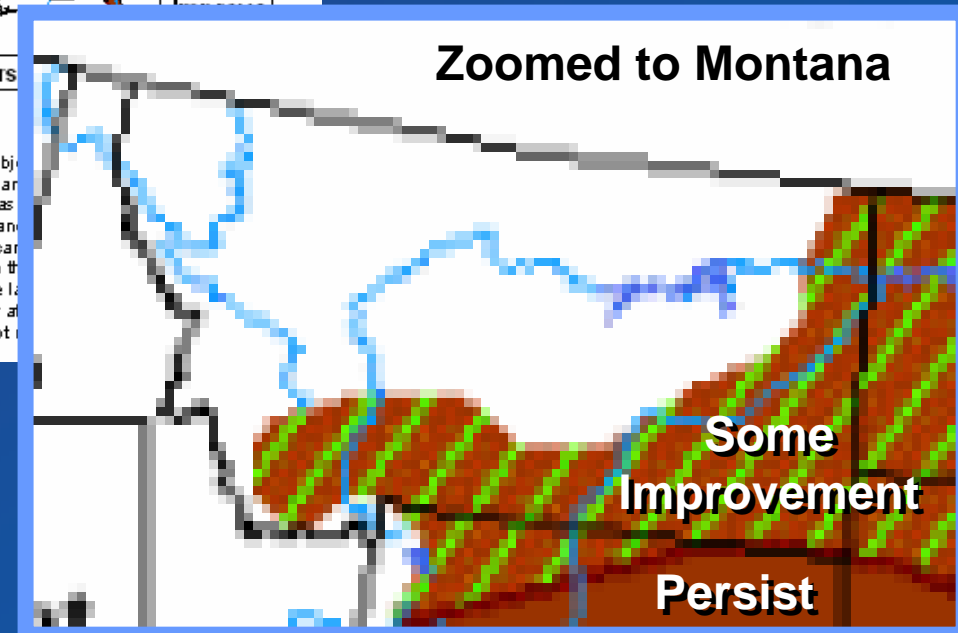
- Better chances precipitation will be below normal across all of Montana
  - 33% to 40% chance for below normal precipitation

# Drought Outlook through June

Issued March 15, 2007



Areas in drought status expected to improve some through the spring



**weather.gov**

**weather.gov/billings**

**weather.gov/glasgow**

**weather.gov/missoula**

**weather.gov/greatfalls**